



CARS Contact

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Calendar

2003

May 28 - Aug. 31 2003-2 User Run
June 3 BioCARS SRP Review
June 29 - July 1 ChemMatCARS Site Visit
August 1 Deadline for 2003-3 APS
General User Proposals
Oct. 14 - Dec. 20 2003-3 User Run

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CARS on the move

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CARS Perspective

Challenges of a National User Facility within the APS

As a national user facility, CARS provides access to synchrotron-based facilities and infrastructure for a broad spectrum of national and international researchers. Since the beginning of operations, CARS has been routinely operating as a dedicated 'general user' facility, with objectives similar to those for the APS General User program now in effect.

The number of CARS registered users currently is 1336 and growing. For any given run, as many as 6 user groups may be at the facility.

CARS sectors have been funded primarily to serve targeted scientific areas and communities. The charge common to all CARS sectors is to enable science for a broad spectrum of users as well as to provide outreach and fertile ground for new researchers in a scientific area. In addition, our user communities and their science have guided our development as a facility.

Experience has shown us that a "one size" user program does not best fit all CARS users. The tremendous success we enjoy as a user facility is closely linked to our ability to connect with our targeted scientific communities in order to provide excellent support to users at all levels of technical sophistication and to respond to the technical challenges presented by frontier science.

It is important that we retain this notion of scientific community development and involvement as we employ the APS General User portal as our link to the community at large. It will not be enough to be 'recipients' of users. The challenge will be to continue as a vital two-way conduit to the facility for the communities we serve, independently of the access portal presented to the user.

Jim Viccaro
CARS Deputy Executive Director

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Students introduced to APS X-ray research

Eleven advanced placement physics students from Riverside-Brookfield High School gained a hands-on introduction to innovative x-ray science at the APS. The students spent the better part of March 7 participating in an outreach workshop at the ChemMatCARS beamline where staff members guided the students from scientific principles to the finer points of experimentation at the facility.

The workshop, which was hosted by CARS and the APS, introduced the students to a typical scientific environment found at forefront research facilities such as the APS. In preparation for a microcrystallography experiment using undulator radiation, the group attended an overview session on x-ray science and beam physics and participated in the experimental orientation required for researchers who use the APS beamlines. They also toured the APS and related CARS facilities.

In the experiment, monochromatic x-rays from a high-brilliance APS undulator synchrotron source were used in conjunction with the ChemMatCARS microcrystallography facility to determine the molecular structure of



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The High School group posing with ChemMatCARS Jim Viccaro, Dave Schultz and David Cookson at the end of the day.

a zeolyte compound employed in the production of gasoline. The procedures the students followed and the overall experience were identical to those encountered in an actual experiment carried out by full-fledged users of the APS facility.

The students provided individual evaluations of their experience in an exit interview form. Their comments will be useful in planning the next workshop. A more detailed account can be found on the APS web site (www.aps.anl.gov) under news items.

X-CARS Nuggets

BioCARS

Results from our users continue to pour in. At the present time, just counting journal articles and dissertations, BioCARS currently accounts for one of the largest numbers of publications of any single sector at the APS.

Over one third of the dissertations listed by the APS have been attributed to BioCARS as are 26% of the journal articles. We would like to think that BioCARS can take full credit for this, but in fact we know that it's really the excellence of our users' science.

This winter BioCARS was able to purchase an ADSC Quantum 315 detector for delivery this summer. This detector, which measures 315mm by 315mm and can read out all 38 million pixels in about a second, will be used for high resolution protein and virus diffraction.

GSECARS

GSECARS celebrated its 200th scientific publication in print, making it one of the most productive sectors at the APS.

In the last two run cycles 2002-3 and

2003-1, 190 visiting investigators conducted over 100 experiments.

On the undulator beamline, the first standing wave experiments were performed using the Newport diffractometer. Other experiments involved the diamond anvil cell and multi-anvil press and included emission spectroscopy measurements on transition metals, pressure scale development, and direct acoustic velocity measurements using ultrasonic techniques as well as others.

Microprobe experiments in the undulator included vanadium oxidation state determination in extraterrestrial glasses and minerals and fluorescence microtomography.

On the bending magnet beamline, the amount of beam time being requested for bulk EXAFS has increased in the past two runs.

Experiments continue using the diamond anvil cell and large volume press with measurements on phase diagrams, melting, and structural properties.

Microtomography experiments on the bending magnet included imaging of meteorites as well as other experiments.

CARS

Successful BioCARS Laue Workshop

In an effort to help its growing group of Laue and time-resolved crystallography users, BioCARS held a Laue Data Processing Workshop on October 9-11, 2002.

Time-resolved macromolecular crystallography that utilizes Laue technique has been a major scientific area of interest for BioCARS since its foundation. In parallel with the design and construction of the BioCARS facility, BioCARS staff has been developing and testing methodology, strategies, essential instrumentation

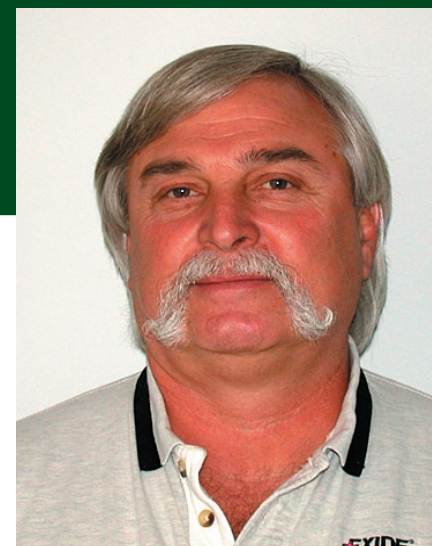
and software for time-resolved experiments (reviewed in Moffat, Acta Cryst. A54, 833-841, 1998 and Ren et al., J. Synch. Rad. 6, 891-917, 1999).

In summer of 2000, BioCARS started the commissioning phase of Laue and ns time-resolved experiments at its insertion device beamline 14-ID. To introduce this still-novel technique to the wider structural biology community, BioCARS organized what turned out to be a very successful workshop in March 2001.

The number of Laue and time-resolved experiments on 14-ID has been growing steadily in the last three years. This welcomed increase in the number of enthusiastic users also presented the BioCARS staff with the need to introduce users to the practical aspects of processing of Laue data.

Since the Laue technique is not yet widely used in the structural biology community, a workshop was held in October 2002. Ten participants from four universities were given an introduction to Laue data processing and latest Laue software developments by Zhong Ren of Renz Research, Inc., a former member of the BioCARS staff and the author of the package LaueView (Ren and Moffat, J. Appl. Cryst. 28, 461-481, 1995).

The remaining time was devoted to practical sessions where each participant completed the analysis of a Laue data set following a step-by-step guide LaueView Basics, and assisted by the BioCARS staff Vukica Srajer, Tsu-yi Teng and Robert Henning.



Meet the Staff

Harold Brewer

Mechanical Group Supervisor

Harold celebrated his 10th year anniversary as a CARS employee last January. Currently in charge of the CARS Mechanical Group, Harold has been involved with most aspects of the CARS beamlines since their inception. Throughout the years working on vacuum and x-ray containment equipment, he has also been instrumental in assembling a technical support group that we feel is one of the best on the APS experimental floor.

Harold's focus has more recently shifted to ChemMatCARS, where his experience is proving invaluable to making the new facility more reliable and user friendly. In a high-stakes research environment, Harold's ability to react rapidly to unforeseen technical challenges and work towards a solution is vital.

When he is not at work, Harold divides his time between his family, a precision welding business he owns and his passion for Drag Racing. In 1999 his team - Don Schumacher's Top Fuel Exide Team - won the World Championship, establishing a world record of 330.91 mph. for the quarter mile.

"The opportunity to show creativity in meeting technical challenges is probably the best part of my job"

User Watch

BioCARS

Recently, a new item has appeared at eye level on the BioCARS bulletin board. Users now have a Boo-Boo list to reflect upon as they launch into sleepless nights and over-cafeination.

Below, the current top-four most popular user boo-boo's - offered in the spirit of caring and sharing:

1. Shipping dry-shipper with cold, wet liquid nitrogen.
2. Forgetting to put a beamstop and exposing the detector to X-RAYS.
3. Fender Bender - Driving the diffractometer into the detector.
4. Breaking the detector beamstop.

GSECARS

At an associate course held in California last December, Mark Rivers, Steve Sutton, Peter Eng, Matt Newville, and Antonio Lanzirotti contributed chapters to a Mineralogical Society of America/Geochemical Society short course volume (#49) entitled "Applications of Synchrotron Radiation in Low-Temperature Geochemistry and Environmental Science"

ChemMatCARS

The latest visitor to liven up the ChemMatCARS sector was Dr Wilfred Fulagar - an ASRP post-doctoral fellow who spent two months assisting the scientists at Sector 15 with experiments and user support. While these activities kept him busy, it seems that one late night, the high-tech APS environment and perhaps one coca-cola too many inspired Wilfred to build a Wimshurst generator out of pop bottles, aluminum foil and sticky tape. What is a Wimshurst generator? Come to the ChemMatCARS LOM and find out...

We miss Wilfried already and wish him well with his ongoing synchrotron research.